

Validation and Performance Assessment of the PEREGRINE All-Particle Monte Carlo Code for Photon Beam Therapy

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PEREGRINE is a 3D Monte Carlo transport code that calculates dose distributions for radiotherapy treatment planning. It is capable of fully coupled production and transport of photons, electrons, positrons, neutrons, protons, and other heavy charged particles. This presentation addresses PEREGRINE's capabilities for photon beam therapy. Each radiation source (photon beam) accounts for the effects of collimator jaws and beam modifiers such as blocks, compensators, and wedges. Absorbed dose is tallied in the patient or phantom as Monte Carlo simulation particles are followed through a cartesian transport mesh that has been manually specified or determined from a CT scan. We will describe PEREGRINE capabilities for photon beam therapy, discuss calculation times and performance, and compare results with measurements for 6 and 18 MV photon beams incident on several phantom geometries.

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